Abstract

Self-assembly of nanoparticles at the interface between two fluids, and methods to control such self-assembly process, *e.g.*, the surface density of particles assembling at the interface; to utilize the assembled nanoparticles and their ligands in fabrication of capsules, where the elastic properties of the capsules can be varied from soft to tough; to develop capsules with well-defined porosities for ultimate use as delivery systems; and to develop chemistries whereby multiple ligands or ligands with multiple functionalities can be attached to the nanoparticles to promote the interfacial segregation and assembly of the nanoparticles. Certain embodiments use cadmium selenide (CdSe) nanoparticles, since the photoluminescence of the particles provides a convenient means by which the spatial location and organization of the particles can be probed. However, the systems and methodologies presented here are general and can, with suitable modification of the chemistries, be adapted to any type of nanoparticle.